Public-Private Partnership Successfully Test Early Oil Spill Detection Sensor in the Tidal Delaware River

By John Yagecic, DRBC, April 2012

During the summer of 2011, the Delaware River Basin Commission (DRBC) and the U.S. Geological Survey (USGS) collaborated with GE Analytical Instruments on a unique test deployment of an oil sheen sensor in the tidal Delaware River. The idea for the test deployment arose during meetings of the Delaware River and Bay Oil Spill Advisory Committee, which includes organizations and agencies with a vested interest in early detection of potential oil spills in this important waterway.

"The cooperation among the public and private sector allowed the work to be performed quickly and at virtually no cost, highlighting the power of strong partnerships," said Carol Collier, DRBC Executive Director.

The unit, a GE Leakwise ID-221 Sensor, was deployed at the Ben Franklin Bridge water quality station at Philadelphia (#01467200) for the 2011 summer monitoring season. The sensor is a continuous monitor that uses high frequency electromagnetic energy absorption to sense the presence of a floating hydrocarbon (oil) sheen. Since water absorbs more electromagnetic energy than hydrocarbons, change in the absorption rate of the water indicates the presence of hydrocarbons. The sensor can detect a 0.3-mm sheen and continues to monitor oil layer growth up to 1 inch.

This ID-221 unit is typically used to detect floating oil sheens in protected settings, for example, wet sumps, tanks, ponds, and monitoring wells. However, the collaborators wanted to see how the device would function in a high energy, ambient environment. In particular, they wanted to see if waves or tidal range in excess of 6 feet would negatively impact the sensors reliability. The team fabricated a stilling well of perforated PVC pipe and installed the detector adjacent to the existing USGS monitor that tracks dissolved oxygen, pH, temperature, and specific conductivity.

Additionally, they wanted to determine if the sensor's signal could be integrated into the USGS communications backbone, the National Water Information System (NWIS). "It was installed and communicating to NWIS within a half hour," said Caryn Cullen, test deployment collaborator and Leakwise Account Manager for GE Analytical Instruments. The ability to communicate through networks like NWIS opens up a wide range of available tools, such as real time alerts, an area of particular interest to DRBC.

The Leakwise Sensor collected 3,700 measurements during its deployment and functioned correctly over a wide range of environmental conditions. Only the extreme conditions of Hurricane Irene generated multiple false positives; however, after the hurricane, the unit recovered and resumed providing correct data.

"We have other sensor models that are designed for near-shore and off-shore marine environments, and the communications setup is essentially the same," Cullen added, suggesting that other Leakwise Sensors can be similarly connected to real-time communications tools.

The success of this test deployment opens the door to several potential uses of this system. For example, ambient water sheen detectors could be installed at drinking and cooling water intakes, which are sensitive to the presence of oil sheens. The availability of early spill detection directly connected to existing continuous real-time water quality monitoring networks is something that should be further explored in the future.

Please contact John Yagecic of the DRBC at John.Yagecic@drbc.state.nj.us with questions or comments on this article. *For additional information on the GE Leakwise Sensors, please visit http://www.geinstruments.com/products-and-services/leakwise-oil-detectors. For details on NWIS, please visit http://waterdata.usgs.gov/nwis./. To learn more about the DRBC, please visit www.drbc.net.*

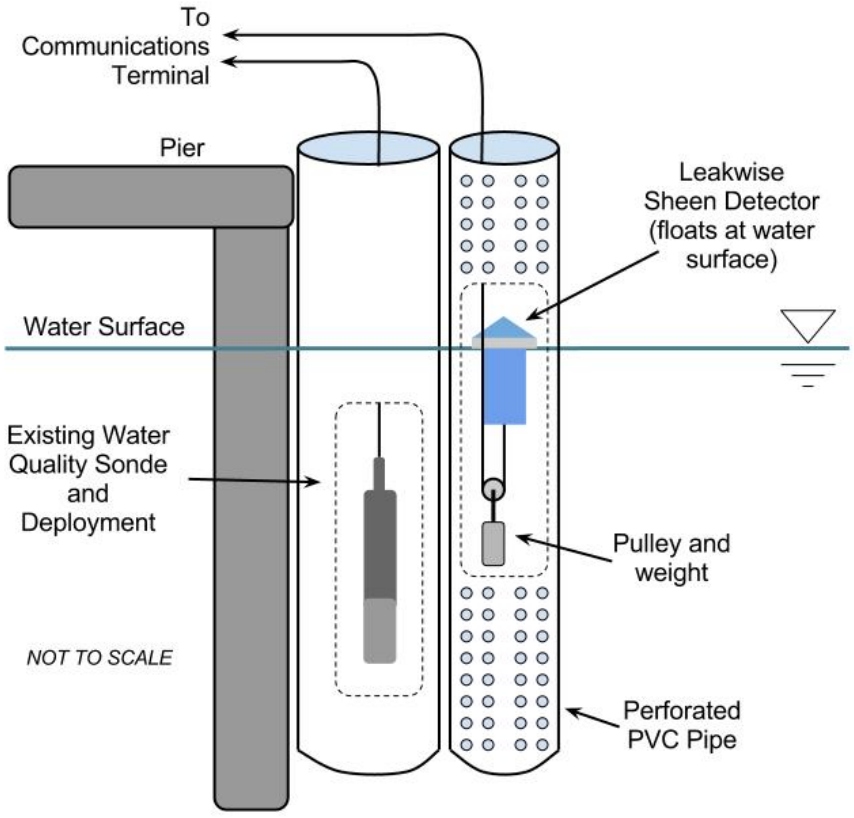

Figure 1: Diagram of the Leakwise Sheen Detector deployment at the Ben Franklin Water Quality Monitor